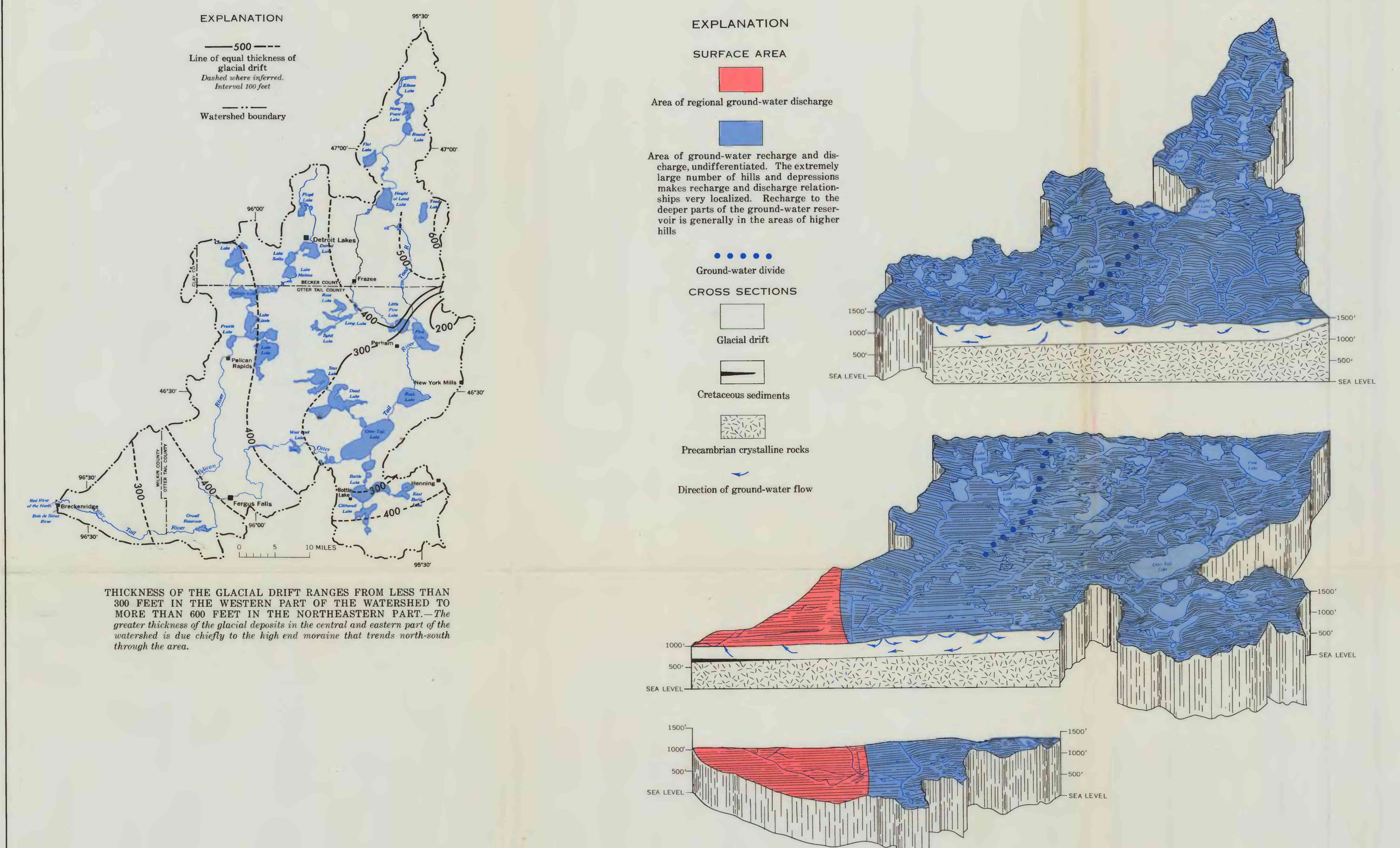


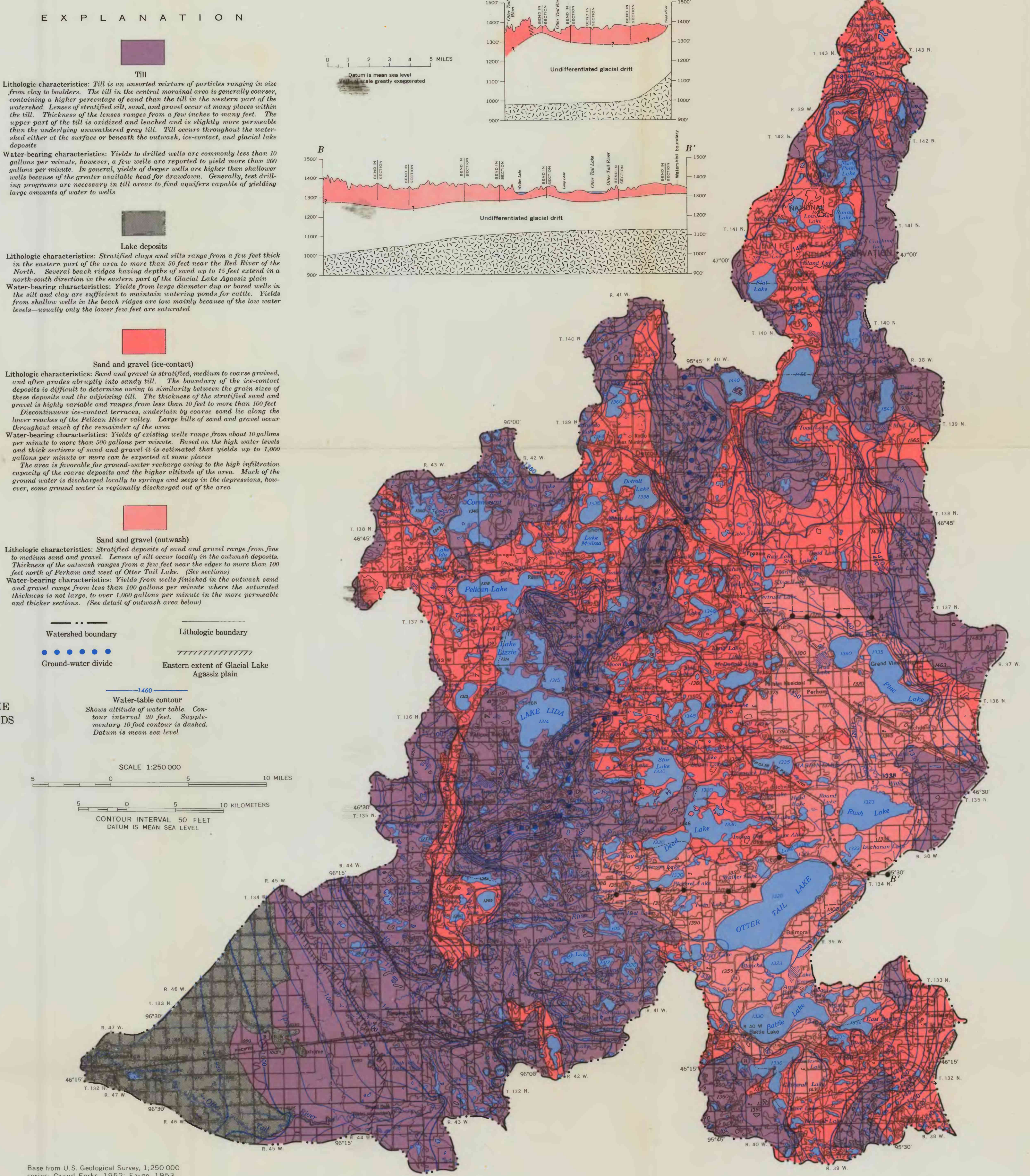
## GROUND WATER



WATER ENTERS THE GROUND-WATER RESERVOIR IN THE HIGHER LANDS AND IN SANDY AREAS AND LEAVES THE RESERVOIR MOSTLY IN THE ADJOINING DEPRESSIONS AND VALLEYS OCCUPIED BY LAKES, STREAMS, OR WETLANDS. Ground water moves westward from the ground-water divide in the central part of the watershed through the deeper part of the ground-water reservoir and is discharged in the lake plain drained by the Red River of the North. Between this

ground-water divide and the lake plain some ground water from the shallow part of the ground-water reservoir is discharged along the Pottowomato River. East of the central divide, ground water moves southeastward toward the Otter Tail River.

COMMUNITY WATER SUPPLIES									
Community	Well construction	Well yield	Quality	Potential for additional supplies	Remarks				
	Depth (feet)	Diameter (inches)	Operating rate (gpm)	Estimated maximum yield (gpm)	Total hardness (gpm)	Dissolved solids (gpm)	Fe (ppm)	Treatment	
Detroit Lakes	245	20	500	1,500+	302	378	0.2	Glacial sand and gravel artesian aquifer, 28 to 34 feet thick, in glacial till. One or two additional wells could be located in vicinity of existing wells. Main city wells flowed naturally above land surface.	Many test wells and former production wells occur in vicinity of present town wells. Other wells within the town yield 50 to 200 gallons per minute from sand and gravel aquifers.
	212	16	300	1,200+					
	235	16	500	1,300					
Perham	100	10	250	345	294	354	0.02	Extensive outwash water-table aquifer over 100 feet thick. Large additional supplies are available from this aquifer. Static water level ranges in depth from 15 to 30 feet below land surface.	Other municipal and industrial wells tapping this aquifer have reported yields of 200 to 500 gallons per minute.
	171	12	500						
Police Rapids	100	12	200	350				Glacial sand and gravel, artesian aquifer, 9 to 21 feet thick, in glacial till. Aquifer is not extensive. Location of additional wells requires test drilling. Static water level ranges from 50 to 60 feet below land surface.	Yields of some wells have declined due to encrustation on well screens.
	118	12	50	450			2.6		
	115	12	200	450			6.92		
	119	12	250	450					
Frazee	150	10	300	500	317	367	2.1	Glacial sand and gravel, artesian aquifer of limited sand content. Aquifer is less than 15 feet thick. Other glacial aquifers of limited sand content and capable of yielding from 300 to 500 gallons per minute to wells probably occur within the vicinity of Frazee. Water levels range from 30 to 60 feet below land surface.	Shallow well, tapping a water-table aquifer, formerly supplied part of the town supply.
	88	16	325	325	360		0.42		
Hering	87	8	100	250	280		1.3	Glacial sand and gravel, artesian aquifer up to 30 feet thick. Determination of potential yield of aquifer will depend upon test drilling. Available head for drawdown above top of aquifer is about 30 feet.	A shallow well, 35 feet deep, yielded 70 gallons per minute from a gravel aquifer within the city limits.
	95	10	250						
New York Mills	125	12	90	400	323	354	3.0	Glacial sand and gravel, artesian aquifer about 20 feet thick. Available head for drawdown is about 60 feet.	Well yields are adequate.
	125	10	130						
Bath Lake	122	11	300	250	275	356	0.02	Glacial sand and gravel, water-table aquifer about 80 feet thick. Large additional supplies could be developed from this aquifer.	
	71	8	300	350					



### LARGE AMOUNTS OF WATER ARE AVAILABLE FROM SAND AND GRAVEL DEPOSITS IN THE WATERSHED

The extensive ice-contact and outwash deposits that constitute a large part of the area are thick and permeable. A nearly full ground-water reservoir is reflected by the many lakes in the watershed which are a surface expression of the water table. The large volume of ground water in storage is sufficient to maintain lakes during dry cycles particularly in the outwash and ice-contact areas.

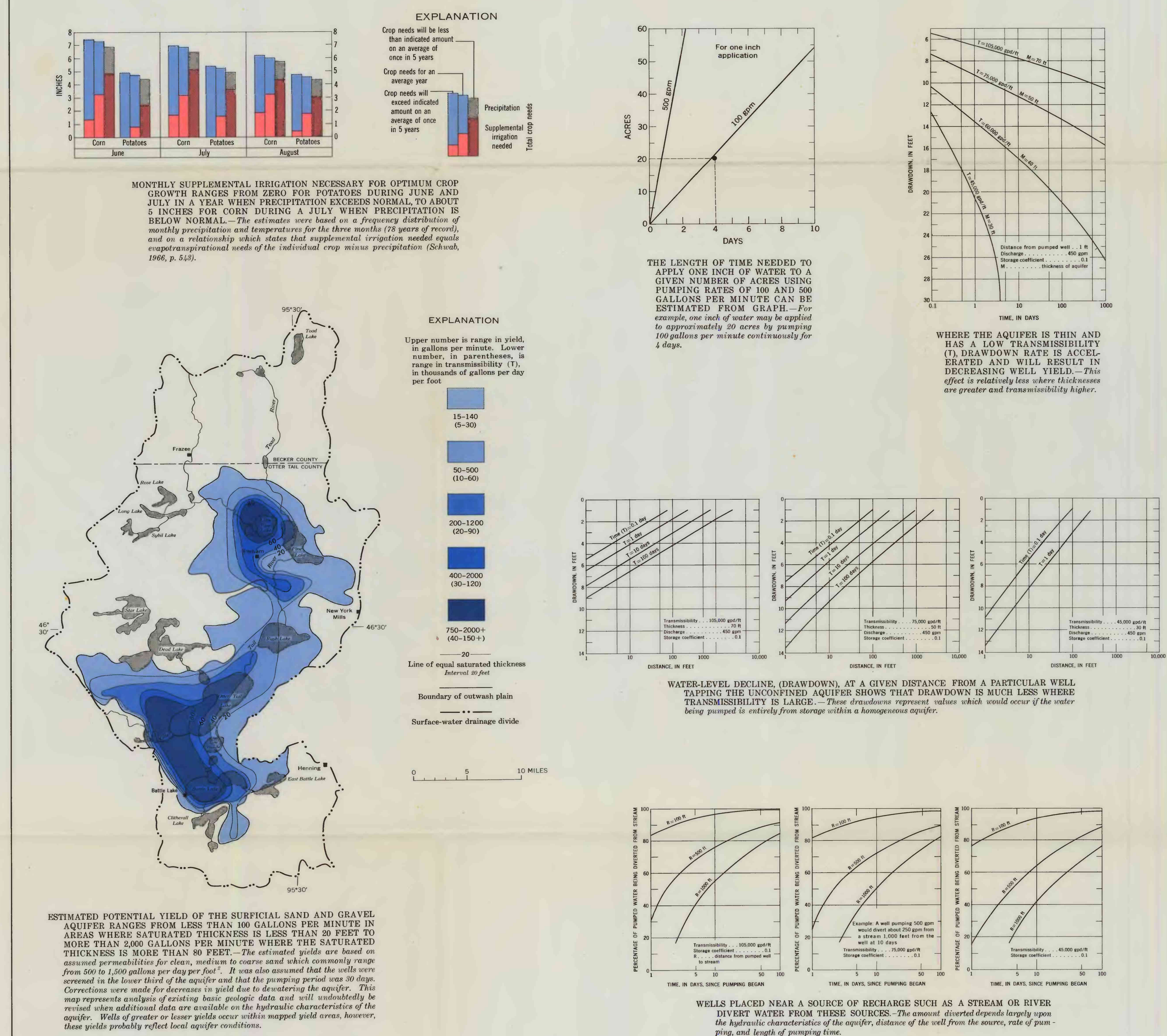
Ground-water flow is separated regionally by a divide extending northeastward through the central part of the watershed. Ground-water movement southeastward from this divide is to the Otter Tail River and its tributaries. West and north of this divide flow moves locally toward the streams and lakes. Some deeper ground-water movement occurs regionally westward toward the lake plain and the Red River of the North.

## PRELIMINARY EVALUATION OF THE OUTWASH AREA FOR GROUND-WATER DEVELOPMENT

### THE OUTWASH AREA IS ONE OF THE LARGEST SOURCES OF GROUND WATER WITHIN THE WATERSHED

It covers about 320 square miles and has about one and a half million acre-feet of water in storage, of which only a small fraction is economically recoverable. The drainage area, which includes the outwash area, covers about 800 square miles and the runoff contribution from this area is about 150 cubic feet per second or 2.4 inches from the basin. The runoff contribution of the outwash area is about 100 cubic feet per second or 1.2 inches. Development

of the water resources of this area will depend upon economic, legal, and physical factors which control the use of water. Additional hydrologic data are needed to define adequately the physical consequences of plans that may be developed. These plans will have to consider the effects of pumping on water level within the reservoir and on surface sources of water.



## WATER QUALITY

